Mapping Human Conflict with Sumatran Orangutans (Pongo abelii Lesson 1827) Based on Community Information in Peunaron Lama Village, East Aceh District, Indonesia

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Abstrak: The Sumatran orangutan is a species of great ape originating from the island of Sumatra and is currently endangered. The survival of the Sumatran orangutan is threatened due to forest conversion to plantations, illegal logging and habitat fragmentation which causes conflict with humans. Until now there is still a lack of scientific information about the mapping of human-orangutan conflicts. In an effort to preserve and protect animals, it is necessary to do a mapping to map the problems that exist in the field. This study aims to carry out mapping to find out the map of the path of human conflict with the Sumatran Orangutan. The method used in this study is field observation and interviews with a qualitative descriptive approach. Data is presented in the form of tables and figures descriptively. The results of this study found a map of orangutan conflict routes which included: residential areas, plantations, secondary forests and primary forest areas. Each of these areas consists of 2 points of conflict path.

Keywords: Conflict; Mapping; Sumatran orangutans

Introduction

Wildlife populations are affected by changes in habitat, carrying capacity, movement, demographics, behavior, interactions and other factors (Kuswanda et al., 2021). Conflicts between humans and wild animals are increasing because their habitat is decreasing, so many animals are leaving the forest and using community plants as a source of food to survive, as happened with orangutans (Kuswanda, 2022).

The Sumatran orangutan (Pongo abelii) is a species of animal that has been included in the red list of the International Union for Conservation of Nature (IUCN) as an endangered species (Sherman et al., 2021). The decline in the orangutan population is affected by logging, deforestation or industrial plantations (Voigt et al., 2018). Tropical rain forests serve as an important habitat for orangutans. Unfortunately, the quality of

their natural habitat is deteriorating as nearly half of the remaining tropical rainforests have been degraded and turned into fragmented forests (Andini et al., 2021).

Oil palm (Elaeis guineensis) is a major cause of tropical deforestation, with 21.5–23.4 million ha being produced globally (Seaman et al., 2021). Oil palm plantations have caused loss of wildlife habitat. According to the IUCN, oil palm cultivation threatens at least 193 species that are listed as critically endangered and its future expansion could affect 39%, 54% and 64% of all threatened amphibians, mammals and birds respectively (Dodson et al., 2021).

Mammals such as orangutans are highly vulnerable to human disturbance and rapid environmental changes due to low population densities and long ranges (Slater & Abdullah, 2020). In addition, the forest structure that changes due to degradation

greatly affects the animals because they depend on the canopy for survival (Hankinson et al., 2021).

Peunaron Lama Village is a village located in Peunaron District, East Aceh District, where parts of its territory have been fragmented into oil palm plantations and are located not far from forest areas. The Peunaron Forest is one of the forests included in the Leuser Ecosystem (KEL) area and is a natural habitat for the Sumatran Orangutan, although the exact number of Sumatran Orangutans in the area is not known for certain, it is estimated that there are still several other Sumatran Orangutans who are still alive. This is evident from the incident in June 2021, a Sumatran orangutan entered the residential area of the community living around the Peunaron forest in Peunaron Lama Village, East Aceh District.

The opening of oil palm plantations in the Peunaron forest area continues. PT Agra Bumi Niaga in Peunaron, East Aceh District has been proven to have carried out these illegal activities. The RAN (Rainforest Action Network) investigation team found evidence of active illegal forest clearing in KEL which is actually the habitat of the endangered Sumatran tiger, elephant and orangutan. Based on an analysis conducted from June 2016 to January 2017, an estimated 324 hectares of forest have been cleared by the company. Only 96 hectares of forest remain in PT. Agra Bumi Niaga which as a whole has permits for around 2,000 hectares. The clearing of the forest not only damages the environment but can also cause conflict between humans and animals (Hanafiah, 2017).

The conflict that occurred between the community and the Sumatran Orangutan in Peunaron Lama Village, East Aceh District was the first conflict event in that village. The conflict occurred because it was suspected that there were several factors, namely: the destruction of orangutan habitat due to forest conversion to oil palm plantations, the distance of Peunaron Lama village to the forest area and the fruit season. Conflicts that occur can cause material and non-material losses for both humans and animals. If there are no serious conservation efforts, the orangutan population will decrease (Kuswanda et al., 2020).

In an effort to preserve and protect animals, it is necessary to do a mapping to map the problems that exist in the field (Santoso et al., 2019). Mapping is a step in grouping data that will be used as geographic as the main process in presenting the map by visualizing the spread of certain regional conditions in rubrics and transcribing the actual situation into a base map and concluded by implementing a map scale (Andi Santoso & Muhammad Nasir, 2021) Mapping is carried out using a Geographic Information System (GIS) or Geographic Information System (GIS) which can store, record, write, analyze and display geographic data (Ginanjar Wiro

Sasmito, 2017). GIS uses various types of data such as points, lines and polygons (Kasnar et al., 2020).

GIS can combine various types of data at a certain point on earth, connect them, analyze them, and map the results. The data processed by GIS is spatial data, namely data that is geographically oriented. In addition, it is also a location that has certain coordinates. This is the basis for reference analysis and the result is mapping (Parhusip et al., 2018).

Method

Approach and Type of Research

This type of research is descriptive research with a qualitative approach. This study used field observation methods and in-depth interviews with the community.

Time and Place of Research

This research was conducted in forest areas, plantations and in residential areas of Peunaron Lama Village, East Aceh District. This research was conducted in March 2022. A map of the research locations is seen in Figure 1.
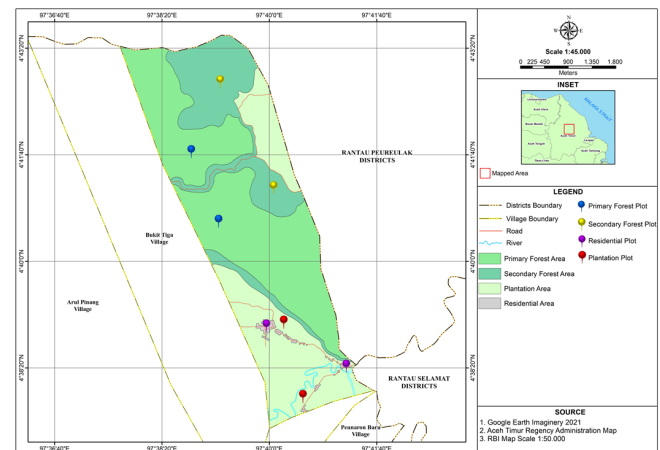

Figure 1. Map of research locations

Research Tools and Materials

The tools used in this study were writing instruments to record observations in the field, a digital camera (12 MP) for documentation, GPS (Avenza Maps) to determine the coordinates of the orangutan conflict path, a tape measure to measure the length and width of the observation path, raffia rope as area boundaries or plot areas in research, interview sheets to find out information from the public about orangutan wandering paths and ArcGIS software for making maps.

Population and Sample

The population in this study were the people of Peunaron Lama Village, Peunaron District, East Aceh District, totaling 276 families. Determination of the sample in this study using a purposive sampling

technique, namely the technique of determining the sample based on certain criteria (Sari et al., 2019). The sample criteria in this study were people aged 18 years and over, both men and women who clearly knew the events of the conflict. The number of samples that fit these criteria amounted to 50 people.

Data collection technique

Mapping the paths of conflict between the Sumatran Orangutan and the community was carried out in 4 areas, namely primary forest areas, secondary forests, community settlements and community plantation areas. The mapping is done using GPS Avenza Maps. Each of these areas consists of 2 plots. So that the total research plot consists of 8 plots. Each of these plots measures 20 m x 20 m. Determination of conflict path points in residential and plantation areas was based on orangutan entry routes obtained from community information, while conflict route points were determined in primary forest and secondary forest areas based on identification of orangutan food tree species found. The next stage, after all the conflict path point data is found, then the data will be followed up to make a map. Making the map using ArcGIS software.

Data analysis technique

Data obtained from field observations and interviews were then analyzed descriptively and presented in the form of tables and figures.

Result and Discussion

Based on the results of interviews with 50 community respondents, it is known that the orangutan entry route starts from the secondary forest area, then the orangutans descend from the secondary forest area to the residential area and continue to the plantation area. The mapping of conflict path points starts from residential areas, plantation areas, secondary forest areas and ends in primary forest areas. Each of these areas consists of 2 points of conflict path.

Taking conflict route points in residential areas at an altitude of 28 masl, plantation areas (28-42 masl), secondary forest areas (113-119 masl) and primary forest areas (135-152 masl). The first point of the conflict route (plot 1) was taken in a residential area, namely the durian tree (Durio zibethinus) because this tree is the first stopover when orangutans enter a residential area. Apart from that, the orangutans also rioted on the tree. The second plot (in a residential area) is on a mancang tree (Mangifera foetida Lour.) because the tree was visited by an orangutan.

The third conflict point was taken (plot 3) in the plantation area, namely in the ylang tree (Cananga odorata), because this tree is a tree used as a nest for orangutans to rest at night. Apart from that, the ylang

tree is also the last stop for orangutans while in Peunaron Lama Village. Taking the fourth conflict route point (plot 4), namely in the plantation area because it is the route that orangutans pass to get to their natural habitat. Furthermore, taking conflict path points is carried out in secondary forest areas and ends in primary forest areas.

The fifth and sixth conflict path points were taken (plot 5 and plot 6), namely in secondary forest areas at an altitude of 113-119 meters above sea level. During tracking in the secondary forest area at the fifth conflict path point (plot 5) 6 species of orangutan food plants were found, namely resin trees (Agathis dammara), forest pandanus (Pandanus sarasinorum), rattan (Plectocomiopsis borneensis), forest melinjo (Gnetum gnemon Linn .) , red soka (Ixora lobbii L.) and wild areca nut (Areca triandra). Then the tracking process continued at the sixth point of the conflict path (plot 6) and found 4 types of orangutan food plants, namely rattan trees (Plectocomiopsis borneensis), forest pandanus (Pandanus sarasinorum), wild areca nut (Areca triandra) and palm trees (Arenga pinnata).

The seventh and eighth conflict path points were taken (plot 7 and plot 8), namely in the primary forest area at an altitude of 135-152 masl. During tracking in primary forest areas at the seventh point of the conflict path (plot 7) 4 types of orangutan food plants were found, namely sugar palm (Arenga pinnata), rattan (Plectocomiopsis borneensis), jernang (Daemonorops draco) and white softwood (Ixora coccinea L). . Then the tracking process continued at the eighth point of the conflict path (plot 8) and 2 types of orangutan food plants were found, namely rattan trees (Plectocomiopsis borneensis) and fig trees (Ficus lutea Vahl) which were found along the roaming route (Figure 2).

Based on the results of field observations of the identification of Sumatran orangutan food tree species which had been carried out at 4 points of conflict routes in primary forest and secondary forest areas, 114 individuals from 10 species and 6 families were found. The results of this study indicate that there are 6 families of Sumatran orangutan food trees at four conflict points in primary and secondary forest areas including Arecaceae, Rubiaceae, Moraceae, Araucariaceae, Gnetaceae and Pandanaceae (Table 1).

Lowland natural forest (primary forest) with an altitude of <500 masl has been identified as the main orangutan habitat. This is because the composition and structure of lowland forests supports the productivity of wild tropical fruits, which are an important component of the orangutan diet (Santika et al., 2017). However, currently, the buffer zone is reduced because most of the forest has been disturbed by human activities, such as through logging, land clearing, and infrastructure development. Community conversion of primary forest to plantation land provides economic resources but

results in reduced wildlife habitat and triggers human-wildlife conflict. In secondary forest the habitat components needed by wild animals such as food, nests

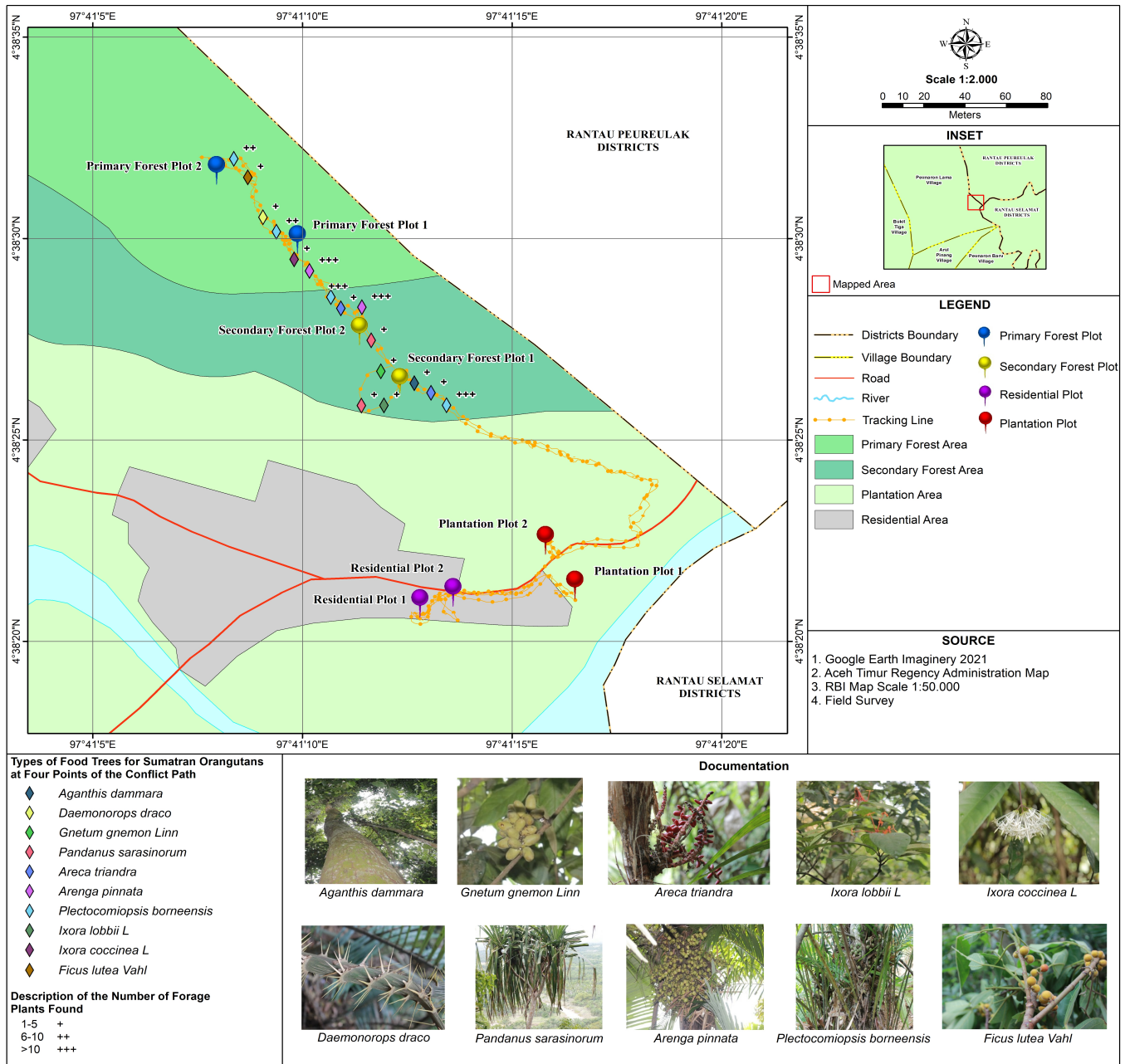and shade trees are decreasing and limited (Wanda et al., 2021).

Figure 2. Map of Sumatran Orangutan conflict routes (Pongo abelii Lesson 1827)

Forest areas that have been converted to oil palm plantations have resulted in the depletion of forage plants in the forest. The low availability of forage plants in the Peunaron forest area in primary forest and secondary forest habitat types makes orangutans expand their home ranges to meet their food needs. Orangutans are wild animals that will roam from one place to another based on the type of food plants along their wandering path. It is aligned with Hermawan et al. (2019) the availability of food at a certain location greatly affects the orangutan home range. According to Fauzi et

al. (2020) when it is not the fruit season, orangutans will explore further to get food because the availability of food in the forest has been depleted so that orangutans will expand their range to find food to residential areas and community plantations.

According to Wanda et al. (2021) Conflicts between humans and orangutans often occur during the fruit season because plants cultivated by the community such as durian (Durio zibethinus), petai (Parkia speciosa Hassk) and jengkol (Archidendron jiringa) are food for orangutans.

Table 1. Types of Food Trees for Sumatran Orangutans at Four Conflict Points

Types of Forage Plants	Famili	Amount
A. Plot Hutan Primer 1		
Rotan (*Plectocomiopsis borneensis*)	Arecaceae	7
Pohon Aren (*Arenga pinnata*)	Arecaceae	27
Jernang (*Daemonorops draco*)	Arecaceae	1
Soka Putih (*Ixora coccinea* L)	Rubiaceae	1
B. Plot Hutan Primer II		
Rotan (*Plectocomiopsis borneensis*)	Arecaceae	9
Tumbuhan Ara/ficus (*Ficus lutea* Vahl)	Moraceae	1
C. Plot Hutan Sekunder 1		
Damar (*Agathis dammara*)	Araucariaceae	1
Pandan hutan (*Pandanus sarasinorum*)	Pandanaceae	4
Rotan (*Plectocomiopsis borneensis*)	Arecaceae	15
Melinjo Hutan (*Gnetum gnemon* Linn.)	Gnetaceae	1
Soka Merah (*Ixora lobbii* L.)	Rubiaceace	3
Pinang Liar (*Areca triandra*)	Arecaceae	1
D. Plot Hutan Sekunder II		
Rotan (*Plectocomiopsis borneensis*)	Arecaceae	22
Pandan Hutan (*Pandanus sarasinorum*)	Pandanaceae	5
Pinang Liar (*Areca triandra*)	Arecaceae	3
Pohon aren (*Arenga pinnata*)	Arecaceae	13

Ecologically, orangutans are an "umbrella species" which plays an important role in dispersing seeds from the plants they consume. Therefore, the absence of orangutans in tropical rain forests can affect the extinction of a plant species (Fitriana, 2021). Orangutan habitat basically has benefits that can indirectly meet human needs and life. Protecting orangutan habitat means participating in protecting forests which have various benefits for life (Pasaribu & Harahap, 2017). Due to the importance of the existence of orangutans and the great pressure on orangutan habitat, there is a need for conservation efforts to preserve orangutans, one of which is by not destroying forests and protecting existing natural resources.

Conclusion

Mapping the path of human conflict with the Sumatran Orangutan in Peunaron Lama Village, East Aceh District including residential areas, plantations, secondary forest and primary forest areas. Each of these areas consists of 2 points of conflict path.

Acknowledgements

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